California Phase 3 Reformulated Gasoline Regulations

January 18, 2000

California Environmental Protection Agency

Air Resources Board

Overview

- Background
- CaRFG3 Regulation
- Effects
- Next steps
- Recommendation

Governor's Executive Order

- On March 25, 1999 Governor Davis issued Executive Order D-5-99 for the phase-out of MTBE from California gasoline by earliest practical date but not later than December 31, 2002
- Directs ARB to adopt CaRFG regulations to provide additional flexibility in removing oxygen while preserving benefits
- Directs ARB to request waiver from Federal Oxygen Requirement from U.S. EPA

Senate Bill 989 (Sher)

- Ensure the CaRFG3 regulations maintain or improve upon emissions and air quality benefits achieved by CaRFG2 and provide additional flexibility to reduce or remove oxygen from motor vehicle fuel

Senate Bill 529 (Bowen)

- Establishes a mechanism for conducting multi-media review of revisions to ARB's CaRFG standards
- Allows ARB to adopt, prior to July 1, 2000, revisions to motor vehicle fuel regulations proposed prior to January 1, 2000 if the Environmental Policy Council determines there will be no significant adverse impact on public health

Benefits of CaRFG2

- Emission reductions equivalent to removing 3.5 million vehicles from region's roads
- Reduces smog forming emissions from motor vehicles by 15%
- Reduces potential cancer risk from vehicle emissions by 40%
- 1/4 of SIP reductions in 1996
- Reduces benzene emissions by half

CaRFG3 Regulations

- Approved December 9, 1999
- Responsive to the Governor's Executive Order
- Removes MTBE from California gasoline
- Preserves emission benefits of current program
- Adds flexibility to minimize loss in gasoline production due to removal of MTBE
- Accommodates need for imports on routine basis

External Process

- Phase 3 gasoline (CaRFG3)
  - Met with individual stakeholders
  - Held 9 public workshops
  - Worked with California Energy Commission
- Advised by consultants from the University of California
  - Dr. Robert Sawyer, UC Berkeley
  - Dr. David Rocke, UC Davis
- Peer Review
  - Dr. Catherine Koshland, UC Berkeley
  - Dr. Donald Lucas, UC Berkeley and Lawrence Berkeley National Laboratory
  - Dr. Larry Caretto, CSU Northridge, Dean of College of Engineering

California Reformulated Gasoline Program

- Limits on the following parameters:

RVP	Sulfur
T50	Benzene
T90	Aromatic Hydrocarbons
Olefins	Oxygen Content

Approved CaRFG3 Specifications Compared to CaRFG2

Property	Flat Limits		Cap Limits	
	Current	Approved	Current	Approved
RVP, psi	7.0	7.0(1)	7.0	6.4-7.2
Benzene, vol%	1.00	0.80	1.20	1.10
Sulfur, ppmw	40	20	80	60/30(2)
Aromatic HC, vol%	25	same	30	35
Olefins, vol. %	6.0	same	10	same
Oxygen, wt. %	1.8 to 2.2	same	0-3.5	0-3.7(3)
T50 °F	210	213	220	220
T90 °F	300	305	330	330

1) Equal to 6.9 psi. if using the evaporative element of the Predictive Model

2) 60 ppmw. will apply December 31, 2002; 30 ppmw. will apply December 31, 2004

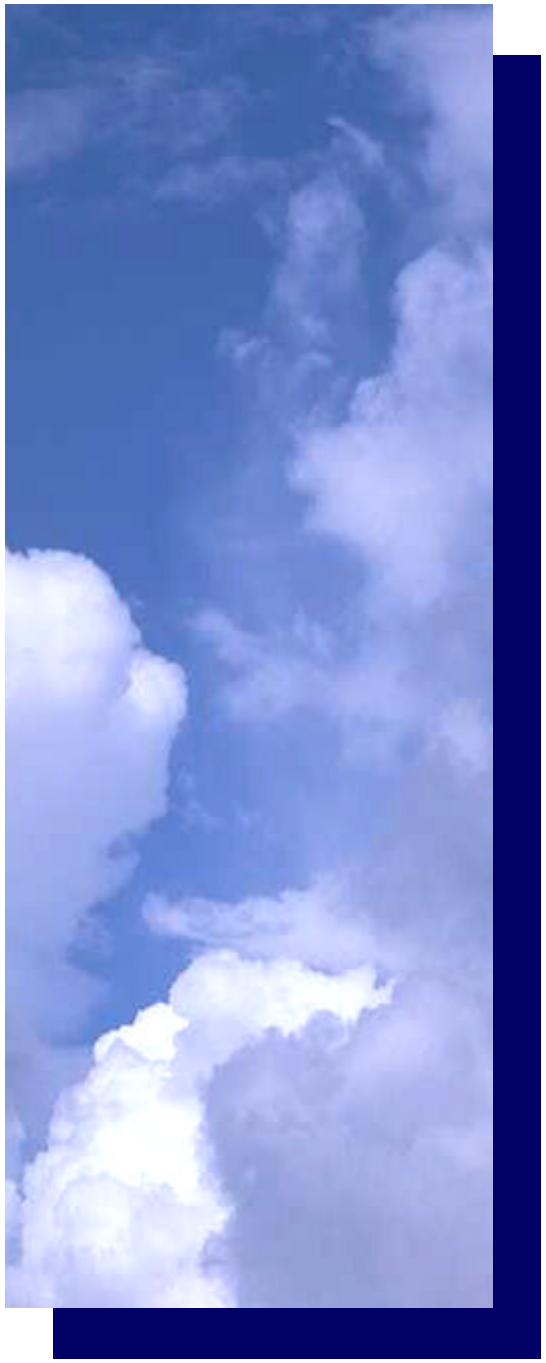
3) Allow 3.7 for gasoline containing no more than 10 volume percent ethanol

Compliance Options

- Meet “flat” limit standards
- Meet “average” limit standards
- Produce formulation certified as equivalent through:
  - Emissions testing
  - Predictive model (flat or average limits)

- Essentially all California reformulated gasoline is now being marketed using the Predictive Model

Effects of CaRFG3



CaRFG3 Program Preserves Emissions Benefits

- CaRFG3 designed to eliminate the use of MTBE while providing refiner flexibility, preserving the existing air quality benefits of the CaRFG2 program
- The CaRFG3 specifications result in no greater emissions of hydrocarbons, NOx and potency-weighted toxics than the CaRFG2 specifications

Expected Changes to Gasoline

- No MTBE
- Increased use of ethanol
- Increased use of alkylate blending components
- Less benzene
- Lower sulfur content
- Blending components similar to today's

Environmental Impacts of CaRFG3

- MTBE contamination of water resources will be limited to pre-existing MTBE contamination prior to implementation of CaRFG3
- Less benzene contamination of surface and ground water
- No net increase in greenhouse gas emissions
- Decreases in NOx, potency weighted toxics and equivalency on hydrocarbon emissions

Ethanol Fate, Transport, and Health Risk Analysis

- Areas investigated
  - Effects on air quality (ARB)
  - Effects on water quality (SWRCB)
  - Health risk assessment (OEHHA)
- Evaluated gasoline formulations that reflect the expected components of CaRFG3
  - Increased ethanol use
  - Increased use of alkylates
- No significant adverse impact on public health or the environment

Next Steps

- Continue to pursue the EPA oxygen waiver
- Various technical issues will continue to be investigated
  - Commingling of ethanol gasoline with non-oxygenated gasoline (can vary depending on consumer habits)
  - Verify that CO credit correctly determined
  - Further evaluation of permeation effects of gasoline containing ethanol vs non-oxygenated gasoline
  - Additional analysis of effects of RFG on off-road vehicle emissions
- Provide Board with update every 6 months
- Changes will be made, if appropriate

After CaRFG3 Implementation

- Upon CaRFG3 implementation, will confirm that in-use gasolines preserve air quality benefits as expected
- Changes will be made, if needed, to ensure real-world emissions benefits are preserved

Summary

- Consistent with Governor's Executive Order
- Meet requirements of Senate Bill 529 (Bowen)
- CaRFG3 preserves emissions benefits and meets Senate Bill 989 (Sher) requirements
- Expected changes to gasoline composition addressed by ARB, SWRCB, OEHHA assessments
- No adverse impacts expected

Recommendation

- That the Environmental Policy Council find that there will be no significant adverse impact on public health or the environment, including any impact on air, water or soil, that is likely to result from the change in motor vehicle gasoline that is expected to be produced to meet the CaRFG3 regulations